Texas Highways

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Texas Highways

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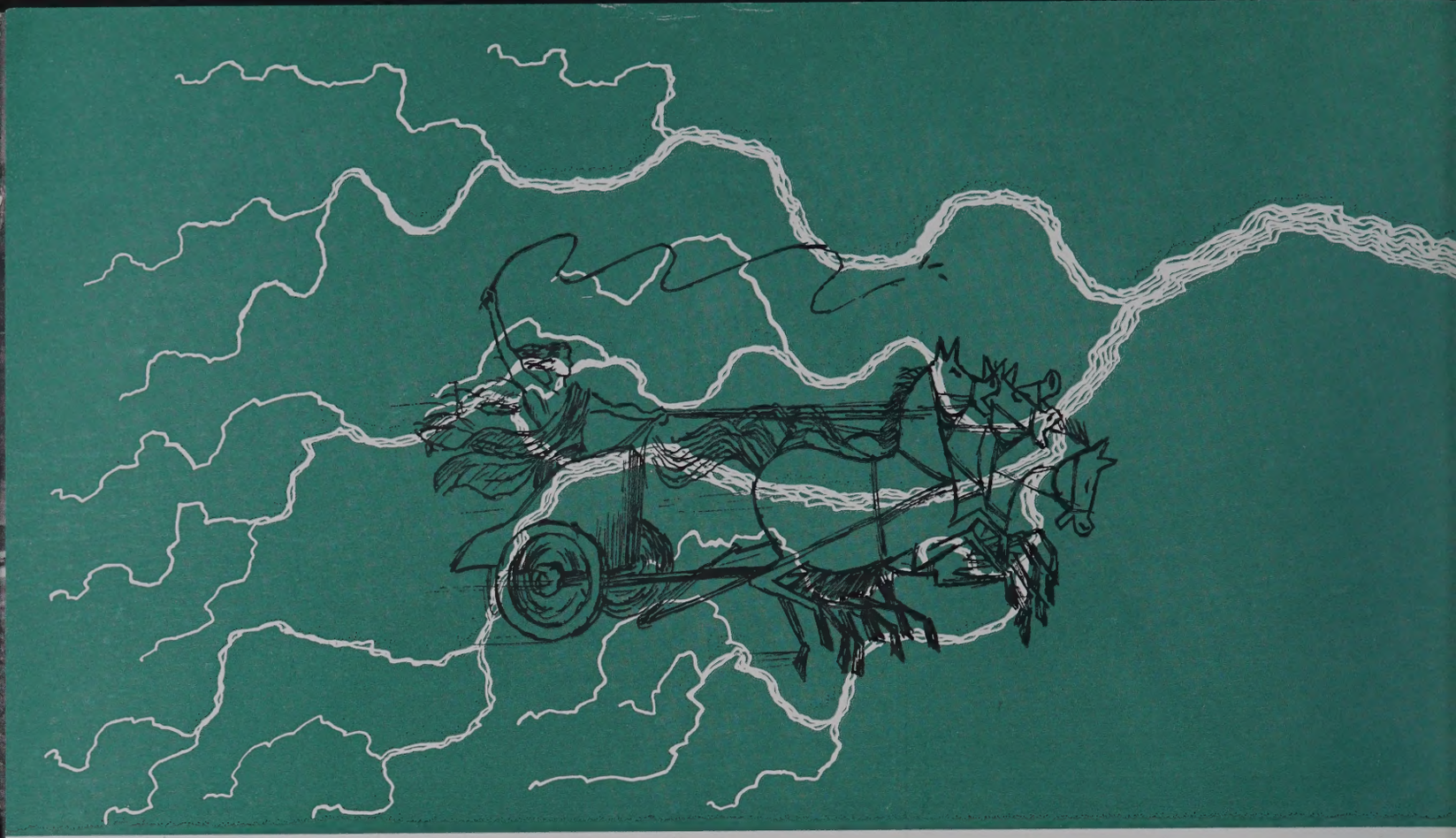
Contents

They Shall Run Like Lightning	2
Tool Room	8
Meet Your Reporters	10
D. E. Meeting	12
Personnel Changes in MVD	14
No-Passing Areas	15
Sidelights on the Computer	16
In the Public Eye	18
Preventive Maintenance	20
A Weighty Device	22
Over the Highways	23



They Shall Run Like Lightning

The Biblical prophet Nahum foretold: "The chariots shall rage in the streets, they shall jostle one against the other in the broadways, they shall seem like torches, they shall run like lightning." (Nahum 2:4)

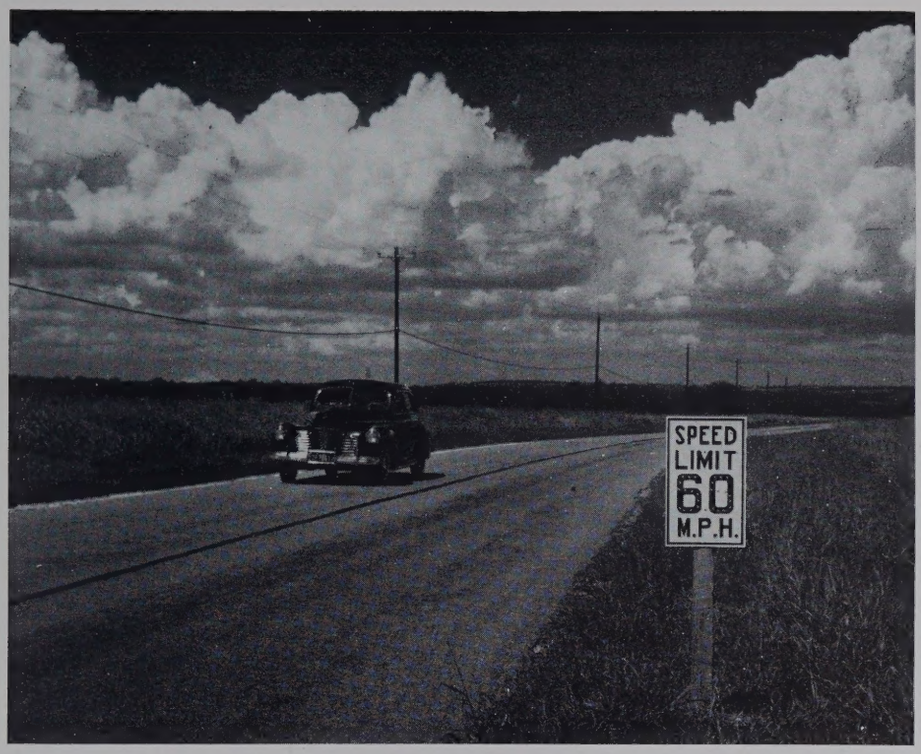
The Twentieth Century has seen this ancient prophecy, made 2,600 years ago, partially fulfilled. Certainly our modern chariots "rage in the streets," and all who struggle through city traffic will confirm that they "jostle one against the other in the broadways." But today's chariots still do not "run like lightning," for man has failed to increase the speed of his private conveyances by more than 60 miles per hour in the 26 centuries since Nahum lived.

However, man is seemingly on the verge of a major breakthrough in private transportation. We now stand on the threshold of the most far-reaching travel revolution in thousands of years—a revolution in which new power sources, new modes of travel, and the wonders of automation will make it possible to traverse the world in complete safety at dazzling speeds.

Ever since the momentous discovery of the wheel about 2,500 B.C. during the Bronze Age, man has been groping with the problem of private transportation. Yet he has made less progress in this field than in almost any other. The "wheel vehicle," a type of chariot, was developed 4,500 years ago as a personal conveyance. Man has added many refinements for comfort and appearance, and has substituted the internal combustion engine for the animal, but actually he is still using a form of the ancient wheel vehicle his ancestors developed 45 centuries ago.

The covered wagons which spanned the North American continent probably moved no faster than the horse-drawn Roman chariots in the days of Julius Caesar. The stumbling block for so many centuries was the animal —old Dobbin could go no faster. That hurdle was cleared when man freed himself from animal power and harnessed the internal combustion engine to his needs. Even so, he added only about 30 miles per hour to his speed.

The modern automobile, developed



In 1941, the speed limit on Texas highways was increased from 45 to 60 miles per hour. Two decades ago, motorists zoomed at the maximum legal clip over narrow, winding roads which invariably connected with the Main Street at city limits. The "60" was designed with reflector buttons to read "55" at night.

during the same half-century which saw the rise of the airplane, has not enjoyed the fantastic advances in speed of airborne vehicles. In fact, man seems to have reached his capacity for speed utilizing the present mode of transportation for private use. The current maximum speed limits have been enforced since 1941. During the last two decades, society has felt that man is not capable of safely traveling faster than 60 miles per hour. These restrictions were imposed in spite of the fact that science and industry have continued to improve both the vehicle and the roadway. Today's automobile costs twice as much, is twice as big, and is capable of traveling twice as fast. The roads are twice as good and three times as safe. But man still travels no faster than he did two decades ago.

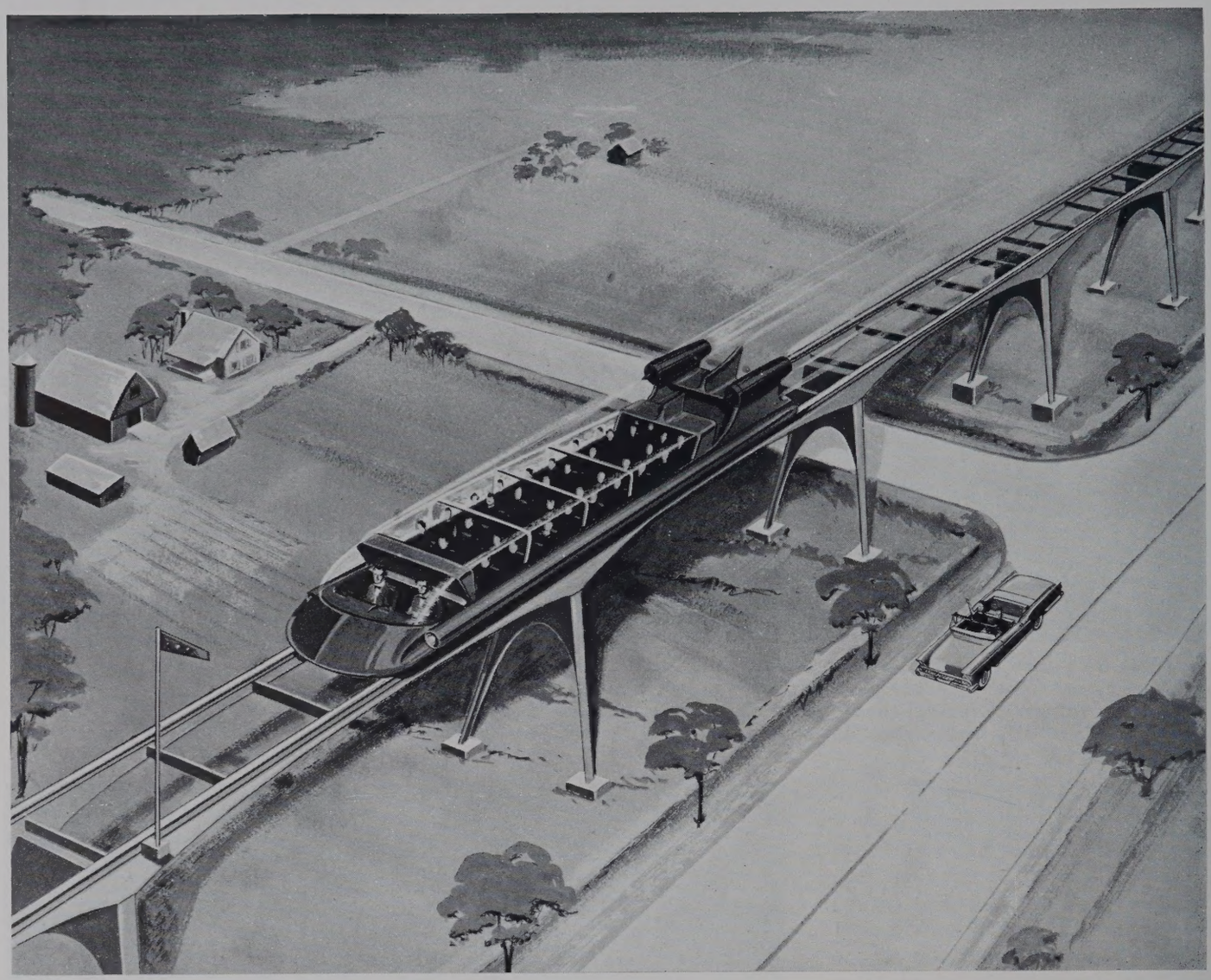
Recently, relays of college students carrying a sedan chair beat a sleek sports car—with an ace racing driver at the wheel—in a race through the traffic-snarled streets of London.

Man's age-old itch to see what is over the next hill, compounded in this complex business world by the frequent necessity to be in several places on the same day, has reached epidemic proportions. It has now become necessary for mankind to criss-cross the planet on which he lives at tremendous speeds and with a maximum of safety.

Ironically, the biggest obstacle yet to be removed before man can break his sluggard's chains in travel is man himself. Human vision and reflexes are not equal to the task of traveling safely at the great speeds in store for the future.

Automation is thought to be the answer. The next logical development is to eliminate the human driver and replace him with machines which can function efficiently at several times human-reaction speed. The skeptics of yesteryear said old Dobbin would never be replaced by a mechanical gadget, but the horseless carriage took over for all time. The skeptics of today might say that the human driver will never be replaced by

In 1960 the maximum speed limit is still the same as in 1941. But the automobile has been greatly improved, along with highways which offer numerous safety features. The modern super highway no longer connects with Main Street but continues through the heart of the city, or bypasses the area.



A vehicle similar to this "Levacar of the Future" may provide fast inter-city travel over distances of 100 to 1,000 miles in the Twenty-first Century. Single-unit Levacars would use "levapads" rather than wheels, sliding on a thin film of air only a fraction of an inch above the rail surfaces at projected speeds of 200 to 500 miles an hour. In this engineer-artist conception, the 40-passenger Levacar would obtain power for both levitation and propulsion from two turbojet engines.

a mechanical gadget, but this turnabout is almost upon us—today man is almost obsolete as a competent driver. Successful experiments have already been conducted with automatically piloted vehicles. "The electronic highway and other special facilities are not fantastic," declares Alfred Johnson, Executive Secretary of the American Association of State Highway Officials. "In fact, these things are on the way and there is a very real danger that highway engineers will find themselves not ready."

It seems certain that man, during the next hundred years, will witness more progress in the field of private transportation than he did during the last 4,500 years. What are some of the amazing changes expected—what will travel be like after 2,000 A.D.?

To find out, TEXAS HIGHWAYS went to the men who should know best, our highway engineers. An "imagineering" poll was conducted, asking some of our engineers to give their imaginations free rein. They were requested to gaze into transportation's crystal ball and give their version of the next one hundred years of travel.

The result was a dazzling futuristic panorama in which travelers whisk across country at blazing speeds on silk-smooth plastic highways. Our engineers foresee a fabulous push-button travel world where automatic computers and electronic safety devices speed man on his way in virtually perfect safety.

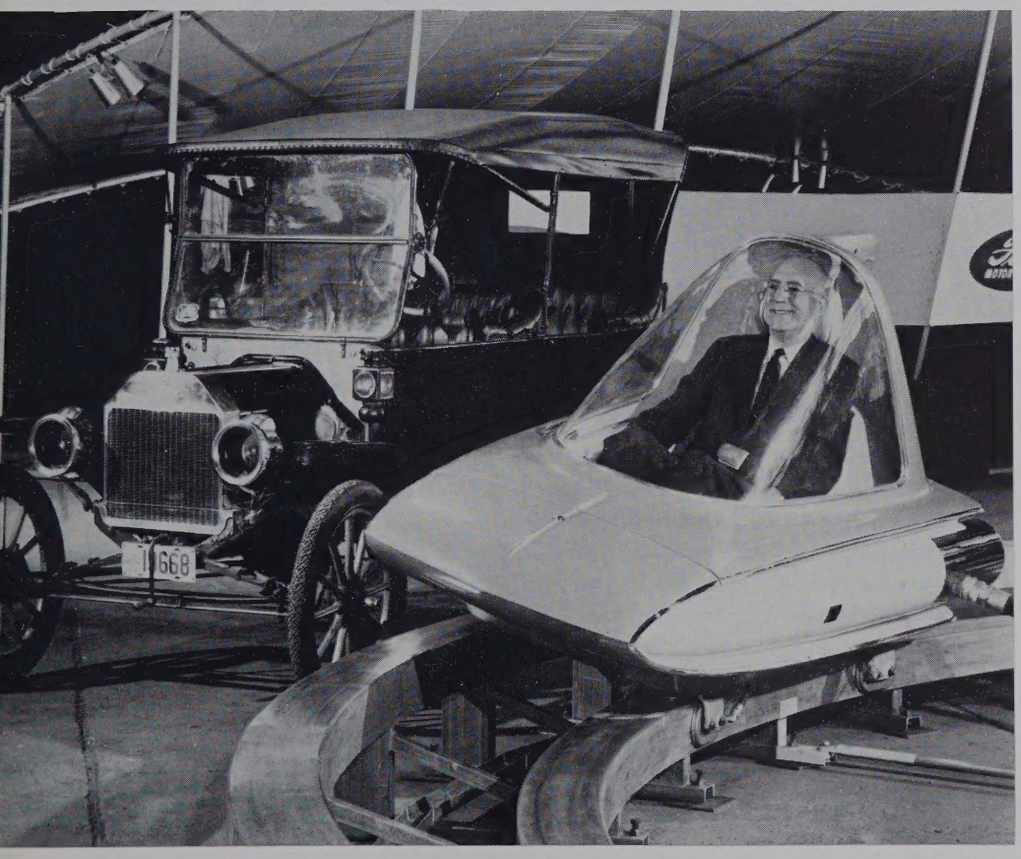
The step which will bridge the present with the push-button future is the electronic highway. This automated highway, which engineers agree

is close at hand, will guide vehicles electronically along present interurban and express freeways. "It is now only a question as to how, when, and where such a guidance system will be initiated in the field of automotive transportation," believes E. M. Carl, Engineer of Surveys, Highway Design Division. Explaining the operation of the electronic highway, he says, "Electronic guidance may be provided by either of two general techniques. An embedded metal strip or cable in the center or center-stripe of a one-way lane would be one of the best and most likely approaches. Another would be by the use of a self-contained guidance system operated from an electronic tape on which directions for starting, speed, steering, and stopping had been previously programmed."

Linking today with tomorrow, the electronic highway will be the forerunner of more radical developments. The vehicles of 2,000 A.D. and after will be drastically different, our engineers predict. The internal combustion engine will become obsolete. So may the wheeled vehicle, after 4,500 years of steady use.

Vehicles of tomorrow will use electric motors or electric energy transmitted by radio. Atomic energy will power the larger, heavier transports. Even the sun may be harnessed to drive a solar-powered vehicle. Instead of wheels, vehicles of the future may ride on rails or on a soft blanket of compressed air a few inches above the earth.

Carl forecasts application of solar power, chemical fuels, and atomic energy for propulsion of both ground and air vehicles. "Major automotive manufacturers now have developed turbine-driven vehicles beyond the experimental stage," he notes. "Jet-driven turbines will make possible vehicle land speeds limited only by the conditions of the travelway and the problem of guidance."



A 1914 high-wheeled Model-T is parked beside a prototype of Ford's experimental Levacar that may be the car of the future. Ford developers feel Levacar may offer high-speed ground transportation from 200 to 500 miles an hour by sliding on air. Dr. Andrew A. Kucher, pictured, first proposed the "sliding on air" principle more than 30 years ago. Visible on the track are "levapads" on which the Levacar slides, holding it away from the rail top and rail sides.

The late William R. Welty, Supervising Traffic Engineer, Maintenance Operations Division, foresaw large land transports powered by atomic reactors and numerous varieties of air travel. "Rockets may be used for high-priority long-distance travel," Welty believed. "Winged aircraft for trips of less than 3,000 miles and hovering aircraft such as helicopters for trips up to 100 miles." Radio transmission of electrical energy will make vehicles independent of petroleum or other fuels, he visualized.

Private transportation will streak through the future at much greater speeds. Predictions among our engineers ranged from 75 miles per hour up to 600 miles per hour. Carl predicts that "speed . . . will be limited only by the physical properties of the vehicle and the travelway. Normal operating ground speeds of 200 miles per hour will be possible with a maximum range of 300 to 400 miles per hour where an adequate travelway is available. Rail transportation in excess of 1,000 miles per hour will be possible by use of rocket propulsion." While disagreeing on the maximum speeds possible, our engineers predicted in unison that travel at such high speeds could be handled with a remarkable degree of safety through automation.

Will man still use highways as a primary means of getting places—or will our roadway system become as obsolete as the horse-drawn vehicle? During some 5,000 years of recorded history, overland travel has been almost entirely by highway. But in spite of the awesome developments expected in transportation, our engineers do not expect highways to become obsolete in the foreseeable future. Some felt they would be more important than ever.

"Man is not as dependent on the highways today as he was 30 years ago because air transport has become

The air scooter, capable of carrying two or three men, flies about two inches off the ground at speeds up to 30 miles an hour. It uses the air cushion, or down-draft principal, and can be mass produced for $300 each, its Bell Helicopter developers, claim.

available," notes Callan Graham, Executive Vice-President of the Texas Good Roads Association. "Yet there is more highway traffic now than before the air age. While other forms of transportation will develop in the future, surface transport will continue to increase and the need for highways will grow."

It was generally agreed that most long-distance travel in the future will be done by air, perhaps by rocketship. Surface highways would be used for short trips and would still be the main standby for heavy transport and freight hauling. To supplement the surface highways, some believe that man may go underground to build a system of subterranean travelways.

He may also go into the air for the same purpose. Wayne Henneberger, Supervising Designing Engineer, Bridge Division, presents this theory: "I think the electronic highway which will develop in the latter part of the Twentieth Century will evolve into a system of low-altitude designated airborne routes near the middle of the Twenty-first Century."

Arthur F. Beck, Senior Resident Engineer of District 18 in Dallas, envisions an integrated system of travelways quite different from our present system. "The need for rapid intracity and intercity transportation will be more intense in the years to come," Beck writes. "Hence the need for new concepts in travel." He describes possible future systems as follows:

"For intracity use there will probably be three systems. First, there will be the street system which we now have to enable us to do our shopping and get us to our homes. Second, there will be a rapid transit of the monorail type, requiring little right-of-way and connecting all parts of the city with the central business district . . . a person could ride to work nonstop from a station near his home at speeds up to 600 miles per hour. Third, a one-lane, one-way, controlled-access system which I will call the 'auto-route,' consisting of a network of concentric circles and crossing routes . . . controlled electronically."

Travel in the future will be marked by the emergency of a multitude of automatic safety devices which will consign today's high accident rate to the dust heap of bad memories. "I visualize all our signing and signalization to be electronically controlled," predicts Jose Correa-R, Senior Designing Engineer, District 12. Correa-R foresees vehicles guided by radar and radio waves.

"Almost complete channelization and elimination of at-grade crossings will provide the greatest single step toward safety," says Gilbert A. Youngs, District Engineer, District 19 in Atlanta.

Welty foresaw that "it will be practically impossible for vehicles to collide or have an accident on the automated highway. With automatic control of vehicles, grade separations will not be required for safety but only for increased capacity. Highway signs will no longer be along the highway. Messages and information of interest to the traveler will flash on his cathode ray screen."

The automatic pilots on vehicles of the future will free the driver to indulge in uninterrupted conversation, watch car-borne television, or simply lean back and enjoy scenic highways —if vehicle speeds aren't so high as to whisk him through the countryside too fast to see anything.

Safety devices predicted included:

Mirrors and/or electronically actuated warning signals will be used on the approaches to blind spots where

hill crests or curvature obscures the view of approaching traffic.

Radar or photoelectric cells sensitive to infrared rays emitted by engine heat of approaching vehicles could be used for protection while driving in foggy or other forms of inclement weather (the so-called "radar braking" included here).

Directional high-frequency radio waves used in traffic enforcement could stop either a single vehicle or groups of vehicles by electronic disruption of the ignition systems.

Predictions of tremendous progress in highway construction were made. The universal concept of building public roads has made slow progress through history—from the time of the Great Appian Way built by the Romans in 312 B.C., little improvement was made until the Scotsman, McAdam, gave the world a new road-building idea in the macadam road some two hundred years ago.

The future holds the promise of great strides in both materials and construction. While the cost of building highways may never get cheaper, it will be vastly easier to build them and ride on them. What materials will be used to build the highways of the future?

"Pavement surfacing in the future," predicted Welty, "might come in endless rolls which can be unrolled and stuck adhesively to the stabilized base. Methods and means for more complete stabilization of expansive soils will be found."

Correa-R describes use of plastics: "I visualize extensive use of different types of plastics for the construction of our highways. Concrete pavements and asphalt surfaces will before too long be obsolete. I think that the riding surfaces of our highways will consist of very thin layers of plastic with extremely good riding qualities, extremely resistant to changes in weather, and easy to apply to the surface."

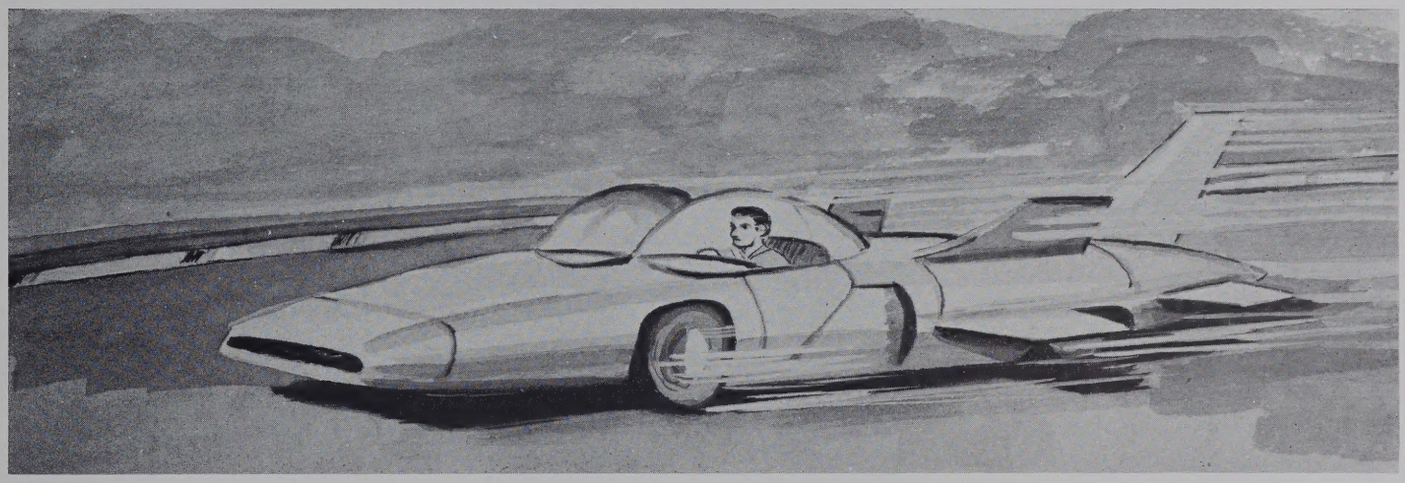
Wayne Henneberger forecasts that "chemicals will be developed that will make soils usable as surfaces, as they are now being used as stabilized bases. Aluminum, glass, plastic, and some light metallic alloys will replace steel and concrete as the main bridge materials."

Carl added these prophecies:

"1. Prefabricated, prestressed, lightweight concrete slabs supported on a pile-driven substructure. Adjustable heads in the pile supports would permit leveling of roadway slabs to compensate for fluctuations in ground elevations.

"2. Application of molten nonferrous metallic spray, in depth, to prepared subgrades or subbases to provide a stable and impervious load-bearing support for roadway traffic.

"3. Prefabricated, tough and pliable, heat and cold resistant, polyethylene mats for roadway surfacing and pavement. These mats could be produced in any desired width and thickness with an ingrained surface texture as desired. The mats could be furnished in rolls of suitable handling size for immediate application, in full pavement width, and could be cemented to the prepared roadbed. It is possible that large-volume use of such mat-type surfacing would make the cost comparable to that of present surfacing methods. There would be further advantage in uniformity of quality controls, strength, durability, and inhibition of moisture penetration by these prefabricated surfacing mats. Also, elimination of flying stone, immediate waterproofing, and reduction in delay and inconvenience to traffic."



This "vision of the future" is in the experimental stage at General Motors. The Firebird III has a gas turbine at the rear which drives the wheels.

The foregoing has been a synopsis of the next 100 years of travel, as seen by our far-sighted highway engineers. It is a complex, fast-paced travel world they predict, filled with remarkable machines invented to do faster and better the things man once did himself.

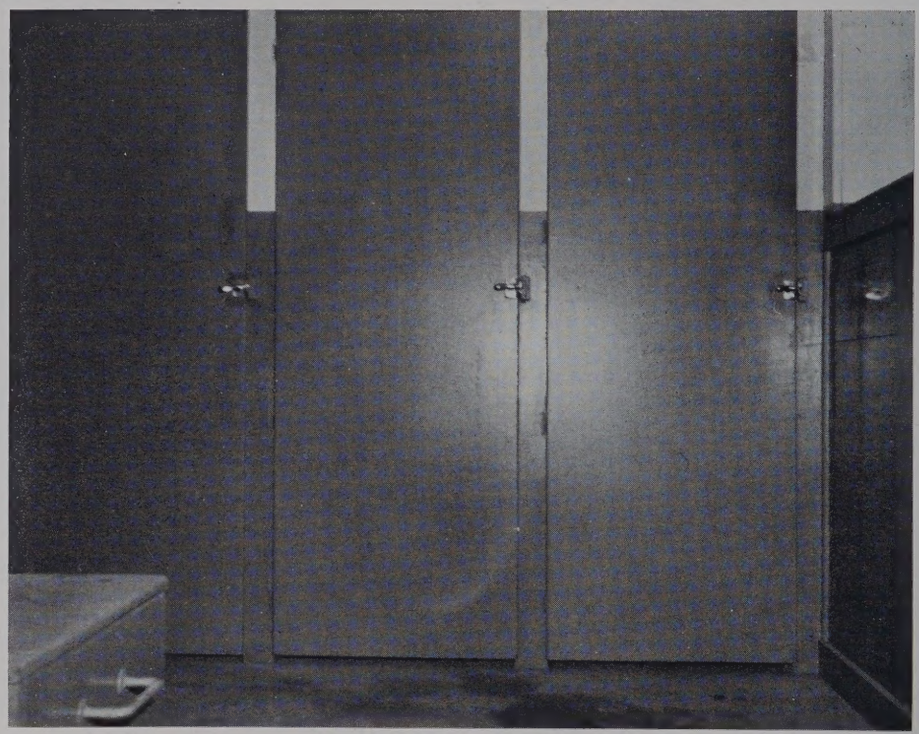
Perhaps it will have lost a little of the attraction of today's open road, when man's speed of eye and hand is equal—almost—to the vehicles he drives. Perhaps it won't be quite as much fun to take to the road in the land of tomorrow—but it will be much faster and safer. Just like the prophet of old said ". . . the chariots shall run like lightning."

TOOL ROOM

Wylie H. Compton, Senior Maintenance Foreman
District 9

In one corner of our Maintenance Warehouse we have constructed a 10-foot by 30-foot tool room. This in itself is probably not uncommon; however, we feel that this particular room is a little above average. Racks and shelves were constructed along one side and across one end, and six feet of the opposite wall. These racks and shelves were enclosed, thereby removing them from sight. Eight 3-foot by 6-foot plywood doors, with one-half-inch pipe conduit as stiffeners, were installed. We now have our tools out of sight when not in use and readily accessible when needed.

Fortunately, windows in the Maintenance Warehouse were placed so that we have one in one end of the room and on the side enclosed. This natural light eliminated the need of artificial light in the enclosure.



Shelves and racks built in the tool room are concealed by doors, providing easy access and neat appearance.

Two doors enclose the storage space in the end of the tool room.

Natural light, provided by the windows, eliminates need for artificial light.

Meet Your Reporters...

Paul H. Coleman

DISTRICT 6

Continuing as reporter for the Odessa District is Paul H. Coleman. The Assistant District Engineer graduated from Texas A & M College in 1938 with a degree in civil engineering. The next year, Coleman joined the Paris District forces as a Rodman, advancing to Senior Resident Engineer before transferring to Pecos as Senior Designing Engineer.

Coleman and his wife, Tommylu, have a seventeen-year-old son. Born in Bonham, the engineer was a first lieutenant in the Army Air Corps and a navigator in the Pacific Theater in World War II.

R. L. Nabers

DISTRICT 25

Rounding up material for the magazine from the Childress District is R. L. (Bob) Nabers. During Naber's Highway career, he has held four titles and worked in five districts. He has been Assistant District Engineer for the past ten years.

Since beginning work with the Highway Department in 1934 as a Rodman, Nabers has had continuous service, with two exceptions. He took a six-months leave of absence to help build the Alaskan Highway and a two-years leave for Army duty.

A 1933 graduate of Rice Institute in civil engineering, Nabers is married and has two children.

Richard C. Crandall

DISTRICT 4

The newly appointreporter from Amarillo District is Richard C. Crandall, Senior Laboratory Engineer. Crandall, who has been a Highway employee for eleven years, started his career in the Amarillo Residency as an Engineering Assistant.

Crandall was graduated from Amarillo High School and attended the Junior College there before entering the Armed Services. A sergeant in the Medical Corps, Crandall spent two and one-half years in the Pacific Theater.

After returning from duty, Crandall continued his education at Texas Technological College. He graduated with honors—and a civil engineering degree—in 1949. Crandall then rejoined the Department.

The District employee ended his bachelorhood recently when he married Doris Wright. Crandall's new wife was a Senior Office Assistant headquartered in Amarillo.

A. F. Cloud

DISTRICT 23

With 34 years of Highway Department experience, A. F. Cloud, Senior Maintenance Superintendent, is well qualified to be reporter for the Brownwood District.

Cloud's career began in 1926. Having completed high school, he became a Patrolman's Helper in District 14, at Briggs. For four years, Cloud carried various titles and

responsibilities of equipment operations until being promoted to Maintenance Foreman of Lampasas County. Seven years later, in 1937, both Cloud and Lampasas County were transferred from District 14 to District 23, where he continued to act as Maintenance Foreman. Special Job Foreman and Construction Superintendent were titles he also held prior to March of 1951, when he was moved to the District Headquarters at Brownwood in his present capacity.

Cloud has four children and two grandchildren.

DISTRICT 18

Grover Green

Covering the Dallas District for TEXAS HIGHWAYS is Grover Green, District Maintenance Engineer. Other titles held during Green's 26 years of Texas Highway service include Assistant Office Engineer, Instrumentman, Senior Office Assistant, Resident Engineer, and Senior Designing Engineer. Checker, in 1934, was the reporter's first position with the Department.

Although born in Dallas, Green grew up in Gainesville, where he attended public schools. He later received his civil engineering degree from Texas Tech in Lubbock. Married, with two daughters, Green served with the Seabees during the Second World War.

DISTRICT 13

Earl F. Wyatt

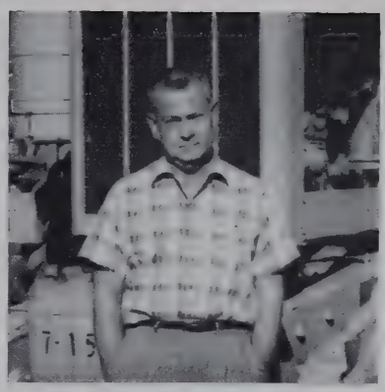
In the past, Earl F. Wyatt, District Maintenance Engineer, has furnished the magazine with many articles from the Yoakum area. (To assist Wyatt now in this undertaking is Vernon F. Matusek, Senior Engineering Assistant.)

A 1950 graduate of Texas A & M College, Wyatt worked for almost a year in Yoakum before being called to active duty. After two years in service, the Gonzales-born engineer resumed work in District 13.

Before appointment to his present post in 1958, Wyatt served for a time in Design Section. He has had different duties in Maintenance Section, too, throughout his ten-year Departmental tenure.

Wyatt and his wife have three sons.

DISTRICT 7



R. N. Jennings

Twenty-five of R. N. Jennings' working years have been spent with the Department in the San Angelo District. During this time, the newly appointed reporter has held various positions, including Rodman, Inspector, Field Engineer, Office Engineer, Assistant Resident Engineer, and Resident Engineer. For the past eleven years, Jennings has been District 7's Maintenance Engineer.

In the mid-30's, Jennings temporarily left Departmental employ for Shell Petroleum Corporation. Three years were spent with their geophysical department in Kansas, Venezuela, and West Texas.

A graduate of San Angelo Public Schools, Jennings continued his education at Texas A & M, where he received his civil engineering degree in 1928.

During World War II, Jennings, a captain in the Army, was stationed in England, North Africa, and Washington, D. C.

DISTRICT 10

George C. Wall Jr.

George C. Wall Jr. started work for the Highway Department as a Junior Inspector in Palo Pinto County Residency, Fort Worth District, thirteen years ago. Now Assistant District Engineer headquartered at Tyler, Wall is also responsible for writing news of his District.

Interrupting his early career in Fort Worth, he returned to Texas A & M and completed requirements for a degree in civil engineering. One month after graduation, Wall became an Engineering Assistant in Palo Pinto Residency. Four years later he was made Resident Engineer, a position Wall held until transferring to Arlington in 1956, where he organized a new Residency.

In 1959, Wall was again transferred—this time to District Construction Headquarters where he was Supervising Construction Engineer. Wall held this post until April of 1960, when he became second in command of the Tyler District.

Born in Paris, Wall is married and has two children. In World War II, he served in the European Theater.

D. E. Meeting

Division Heads and District Engineers gathered for their annual meeting July 13-15 are pictured on the steps of the Main Office Building in Austin. First row, left to right, they are: E. W. Mars, A. W. Eatman, D. C. Greer, George Pendergrass, Thomas C. Collier, P. S. Bailey, Robert E. Lindsey, Robert J. Milligan, G. A. Youngs, B. L. DeBerry, and W. E. Simmons.

Second row: Archie Sherrod, Ed Bluestein, J. A. Waller, J. C. Roberts, Jed N. Robinson, D. T. Harkrider,

R. C. Faltinson, T. S. Huff, Palmer Massey, L. D. Cabaniss, and John H. Crook.

Third row: J. F. Snyder, Randle B. Alexander, James M. York, George L. Carver, Sam Huff, John B. Nations, C. N. Parsons, J. C. Dingwall, M. G. Cornelius, Robert O. Lytton, and T. O. Foster Jr.

Fourth row: C. B. Thames, A. H. Christian, L. B. Dean, A. C. Kyser, Charles W. Smith, W. E. Carmichael, O. L. Crain, H. L. Arno, R. A. Bossy, J. A. Snell, W. W. Potter, and Fred T. Bennett.

Personnel Changes in MVD

- **D. T. Harkrider Retires**
- **Bob Townsley New Director**

Retiring Director of Motor Vehicle Division D. T. Harkrider completed his service with the Department the end of July and left Austin the following morning to embark on his new career in the insurance field.

Named Director of Motor Vehicle is Robert Wickline Townsley Jr., formerly Chief of Registration Section. Townsley, with nineteen years of service, joined the Department in 1941 when the responsibilities of Certificates of Title were taken over from the Department of Public Safety.

Harkrider was with the Department 27 years, with duties ranging from bookkeeper to Director of Insurance Division to his final position in Motor Vehicle Division. He headed D-12 for seven years.

Townsley, 40, attended North Texas Agricultural College, concentrating on engineering and special studies in law. Born in Blanco, he is married and has two children. Townsley saw four years service in the Army Air Corps as first sergeant in the 311th Bombardment Squadron, with 27 months in the African and Italian campaign.

D. T. Harkrider

R. W. Townsley Jr.

Signing through

NO-PASSING AREAS

Joel D. Willson, Senior Maintenance Superintendent
District 5

In the hilly country just below the Cap Rock east of Post on U.S. 84, we have a construction job in progress. On this job we are experimenting with what is to us a new method of handling traffic in the no-passing areas in the hills.

U.S. 84 is a four-lane divided highway. The north lanes, usually carrying only west-bound traffic, are new. The south lanes are barricaded at both ends, and equipment is working throughout the entire length. This places both east- and west-bound traffic in the north lanes.

Instead of using yellow traffic paint and striping the numerous no-passing zones on the hills, we are using a combination of "Two-Way Traffic," "Do Not Pass," and "Pass With Care" signs. These signs are in use throughout the 24 miles of the project, and traffic is moving smoothly and safely.

If we had striped in the usual manner, the yellow paint would have still been there long after the project is completed, and would have been very objectionable after reverting back to one-way traffic in the north lanes.

Sidelights on the Computer

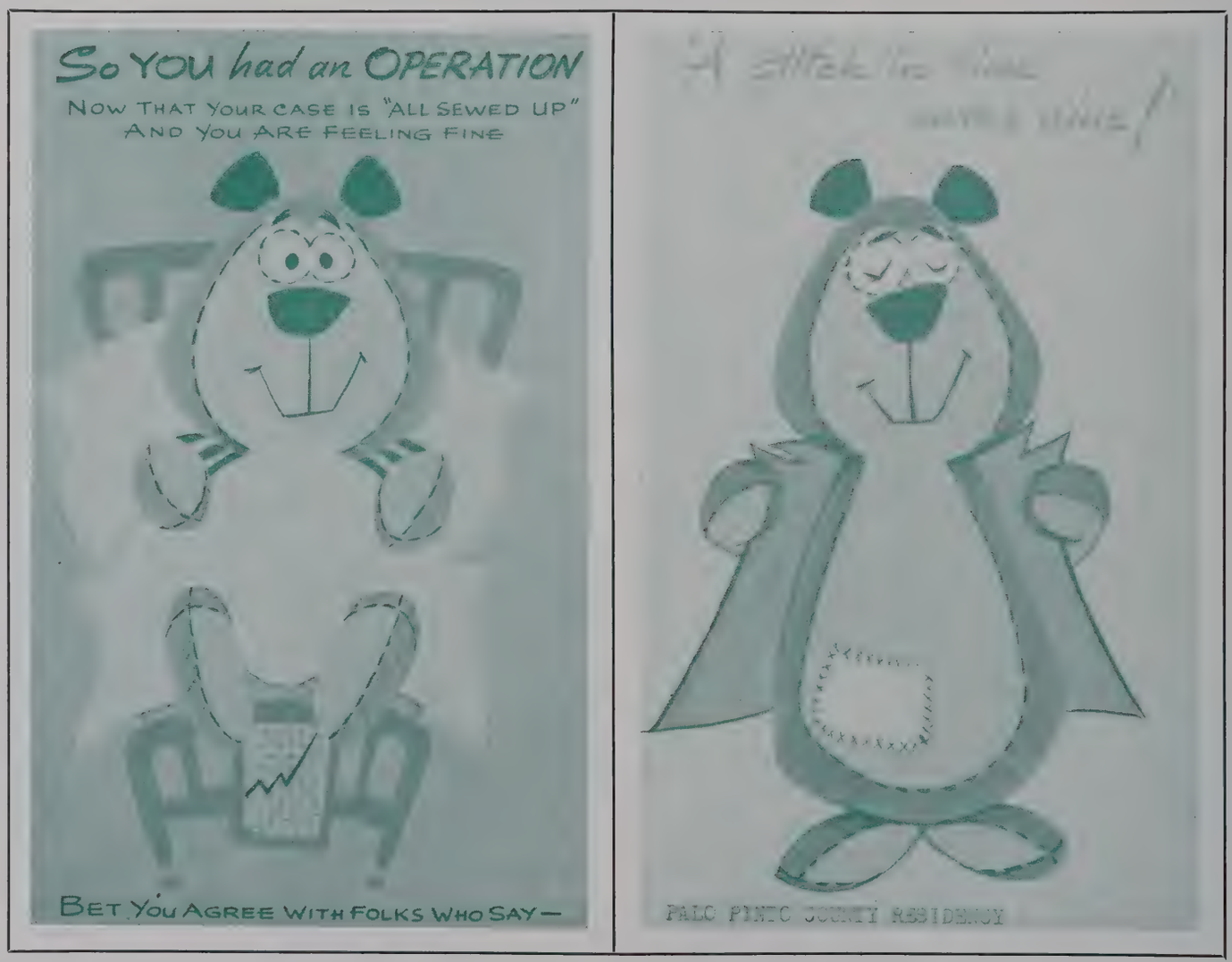
Marjie Mugno, Journalist
Travel and Information Division

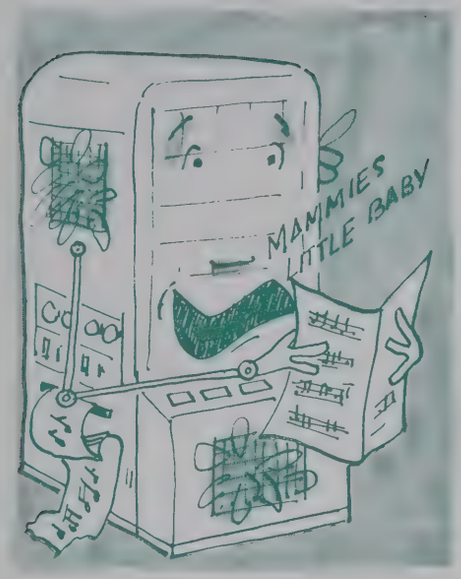
In mid-December, the Department's 650 IBM computer in Austin got sick. That was when the virus epidemic was hitting hard, but the computer's illness was more serious. In fact, its condition was critical. Operations Division personnel had to send the parts clear to Rochester, New York, for doctoring.

By letter, computer "customers" were notified that, due to its convalescence, work would be late. Soon after, reports D-21, the computer (not the Division) received a "get-well" card from Palo Pinto County Residency, District 2.

The Residency's thoughtfulness alerted us to the humanness of the computer (and its 5,000 computer cousins in use throughout the country) and prompted interest in newspaper items heralding computers and their accomplishments.

From Ithaca, New York, comes the story (supposedly true) about the electronic computer which caught a human competitor cheating at tick-





tacktoe.

Said the computer, "Naughty, naughty. You didn't play fair last time. If you promise not to cheat, we can play again." (Actually, the computer in its programing was precautioned against such practices.)

In a more serious vein, the *Virginia Road Builder's* May edition reveals that computers will be used soon to find a fair method for appropriating highway-users taxes. Data fed computers, hopes the publication, will determine how much users should pay toward the heavy and increasing cost of building adequate highways.

And according to the Soviet news agency, a factory in Latvia is constructing an electronic computer to run a ten-car train. With advance-fed data on the train's route, line voltage, and wind force, tells Tass, the computer keeps the train on schedule, controls its speed, and makes it react accurately to other signals.

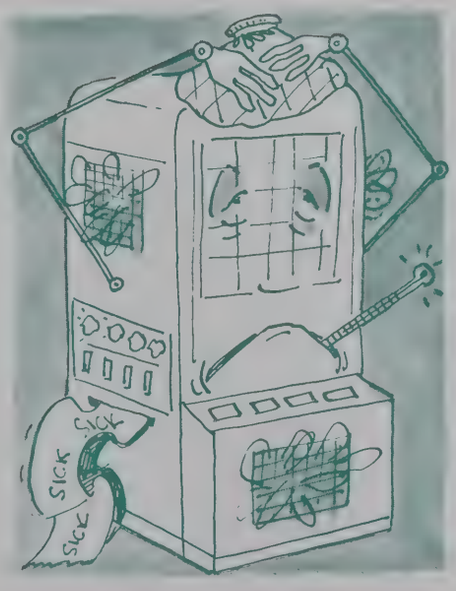
An electronic calculator, claims a Johns Hopkins professor, has proven sound the old adage, "Two's company, three's a crowd." The computer showed that when three persons congregate, two pair off in a closer relationship—even if all three are alike in personality and temperament. Concluded the article, "The machine didn't say why."

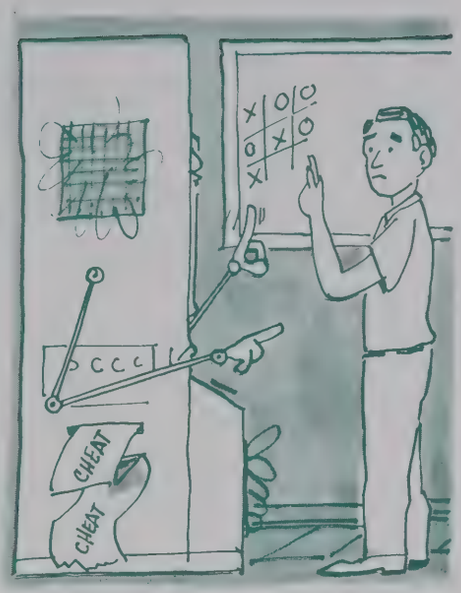
And, thanks to an electronic computer, the four-month-old daughter of a Chinese laundryman was able to get the proper medical treatment. Here's what happened. Doctors at a New York hospital were unable to learn the baby's medical history because of the language barrier. They called police, who ran coded cards on special abilities through one of the computers accessories, the sorter, and uncovered the name of a detective who could speak the Cantonese dialect. By telephone, he interpreted for doctors and the father.

Singing has been mastered by machines, too. "Mistic," ran an Austin Statesman story released from Michigan State University, often works alone at night and sings to its project programers over the telephone. It tells them—in squalls that sound like a bagpipe—that all is going well.

(According to John Mannix, Supervising Program Engineer of D-21, the mathematical machine, through its program, might possibly simulate vowel and consonant sounds to thus produce musical tones.)

Furthermore, computers may someday be self-producing and self-improving. So says a Stanford University professor who predicts that a computer's "offspring" will be better, faster, and more efficient. Its descendants possibly could become smarter than the man who originated the computer. Improvements, proposes the professor, will come from the devising of better circuits as the machine reproduces.





Present computers don't always have their feet on the ground—sometimes they too, like their human friends, are "up in the air." To wit: a computor piloted an Air Force 70-foot jet 2,500 miles across country. The machine, which did everything but land and take off, flew all but five minutes of the trip (three hours, seventeen minutes).

Although the character of the computer is unquestioned and its surprising powers well known, breathes there a soul who believes that machines will ever make man obsolete? Computers are not yet—and probably never will be—capable of original thought.

Emphasizing the machine's dependence on man is a statement made by Mannix in the June issue of Travis Engineer. Said Mannix, "The computer doesn't question motives or logic. If you give the machine nonsense, you receive a nonsense answer."

Pointing up another reason why computers will never completely replace man was a feature in a Sunday supplement recently. Said author Ben Lucien Burman, "Humor is a synonym of humanness—one of the chief things that makes man different from a machine. For although I have watched an electronic brain accomplish astounding mathematical marvels, I have never seen one that was able to smile."

IN THE PUBLIC EYE

LOOKING AHEAD

Houston Post, on Texas and taxes—"Thanks to the forward-looking policy of the State Highway Commission, Texas is already well endowed with a good system of roads. . . . Highways are expensive to construct, and the federal and state programs involve billions of dollars. It is, however, money well spent in the national interest, and the taxes necessary to support it, whether state or federal, will give every motorist full value in return when he travels the new highways."

Austin American, by editorial—"County delegations are telling the Texas Highway Commission that the Legislature should revise the farm-to-market road law to remedy an unusual provision which prohibits spending any of the annual $15 million farm-to-market roads appropriation for maintaining the roads after they are built.

"Expert traffic estimates set the state's needs of those farm-to-market roads at about 35,000 miles, and most of this construction has been achieved.

"Two policy questions lie behind the suggestions that the fine system of secondary roads should be maintained from the same source they were built . . . one is that the state cannot afford to let these roads deteriorate. It must maintain them. Maintenance now costs more than the annual primary appropriation for building these roads.

"This maintenance money is drawn from the state highway fund, and therefore prevents many miles of state-designated highway from being built each year."

Austin Times Herald, in a column titled "Top of the Avenue" on our Tourist industry—"Texas is going after the big, lush tourist business.

"Next step in that direction will be distribution of a 32-page brochure, with full color pictures, by the Highway Department beginning in October.

"The booklet will be a sort of showcase of Texas, designed mainly for the out-of-state visitor and will give him a cross-section view of the state, geographically and otherwise.

"Texas has a wide variety of interesting activity awaiting the tourist.

"All the same, it takes a selling effort to lure the traveler and his big fat dollar away from other vacation meccas."

LASSOED AFLOAT

Lubbock Avalanche Journal, quoting a motorist's remarks on discovering that little foreign-made cars can float—"He [the motorist] said his station wagon . . . floated off a highway west of Levelland . . . [and] said, 'It appears to me that the roping ability of the old west has not disappeared. They just threw a rope from a highway department vehicle around me and pulled me back onto the road.' "

THE GRASS IS GREENER . . .

San Antonio Express, delving into a dilemma facing the Alamo City's county commissioners—"How can a cow get from one side of a six-lane expressway to pasture land on the other side?

"And is that the rancher's problem or the county?

"These were questions . . . [being] considered . . . [in] a plan to build cattle passes under future main highways.

"L. J. (Buck) Gittinger, court legal advisor, noted that 'the county shouldn't obligate itself to put these passes in.' Gittinger said the county paid for any such problems in severance damages paid to ranchers."

WIDE-OPEN ART GALLERY

Tyler Courier-Times-Telegraph, in a United Press International story datelined Chicago—"Outdoor billboards will shortly feature reproductions of famous paintings . . . throughout most of the country.

"Burr L. Robbins, an advertising executive . . . said his company would display the reproductions as a public service, to build mass appreciation of fine art and to encourage visits to art galleries."

TAKE YOUR CHOICE

Austin American, discussing State Highway Commission action—"The commission also authorized financing for the remaining section of ranch-to-market road 170 in Brewster and Presidio counties to provide tourists a third route into Big Bend National Park.

"The 28.6 mile project will be bid on in September and will cost about $1,235,000. The road will go through some of the state's most rugged country, from five miles east of Redford southeast to the Brewster County line. The commission said completion of the ranch road will give complete circulation through the Big Bend area."

MASS TRANSIT

Houston Chronicle, regarding a traffic survey taken by the Department's

Joe Wright and co-ordinated by public works director Eugene Maier—"Mass transit is not the answer to transportation problems in Houston. Bus transportation will be just a supplement to the automobile.

"Maier said there are some views that cities should abandon freeway programs in the downtown area and concentrate on mass transit.

" 'We will always need a good transit system, but to say freeway construction is not meeting the needs is dangerous thinking,' Maier said."

UNDER THE RIGHT OF WAY

Houston Post, giving details of the Texas Legislative Council's confab on oil and gas development on state-owned highway right-of-way—"There is no 'ground swell' of demand for oil and gas leases on Texas highway rights of way, State Engineer D. C. Greer told the Texas Legislative Council. . . .

"The council received a prepared questionnaire sent to other oil and gas producing states to determine their laws and policies on leasing highway rights of way for oil and gas development.

"In a recent opinion the attorney general held that land under highway rights of way in Texas is owned by the state."

TALK IT UP

Corpus Christi Caller, claiming that better state park roads, now possible through Highway Commission action, will boost tourist trade—"Heretofore, the state commission has assumed responsibility only for the maintenance of roads connecting state parks with the nearest state highway.

"On the request of the State Parks Board, the Highway Commission will hereafter pay construction costs of such roads but the county and the parks board will furnish the right of way.

"Let us face it. Texas was slow getting started with its state parks system, and never has exploited it on the scale many other states, less blessed with scenery and abundance of wildlife, have achieved.

"Texas should not neglect its latent opportunities to capitalize on the travel craze to the fullest extent."

Dallas Morning News, reporting comments made by Russell E. Singer of Washington, D. C., executive vice-president of the American Automobile Association—"Texas is not getting its rightful share of the nation's annual $20,000,000 tourist business . . . we should spend more time telling the world about our tourist attractions."

RIBBON FEVER

Beaumont Enterprise, datelined San Augustine—"Approximately 1,500 persons Friday looked up at a ribbon of concrete—the new $2,000,000 Angelina River bridge—and heard officials describe it as a welcome link with progress, while government officials were lauded [by State Highway Engineer D. C. Greer] for taking the lead in getting the structure built.

". . . the trestle . . . one day will span the water of McGee Bend Lake when water is impounded for the McGee Bend Dam.

"The bridge now links Zavalla and Broaddus in San Augustine County on State Highway 147."

Dallas Morning News, marking completion ceremonies of a four-lane project extending from Dallas County to Cooke County—"State Engineer D. C. Greer and Charles F. Hawn of the State Highway Commission helped cut the ribbon Wednesday that officially opened 44 non-stop miles of Interstate Highway 35 and 35-E through Denton County.

"Greer said 300 people will be alive in Texas at the end of the year who would be killed if it were not for the new freeway system."

CONSTRUCTIVE THOUGHT

Waco News-Tribune, quoting a speaker supporting road bonds as key to the future—"Frank Maddox, insurance man and member of the speakers bureau . . . told Waco Jaycees the future progress of McLennan County may well depend on the expansion and improvement of its highway system.

"McLennan County and the State Highway Department share equally in the expense of rights-of-way cost for state projects.

" 'The state,' Maddox said, 'spends $15 in highway construction money for every dollar the county spends for rights-of-way.' Maddox said the money spent on highway construction in this area has 'tremendous impact on our local economy.' "

And Now the Driverless Carriage

Texarkana Gazette, commenting editorially on electronic highways—"First they got rid of the horse; now they're getting ready to do away with drivers, too.

"The advantages of automated highways are many. . . . But anyone who owns a television set or uses an automatic elevator or thermostat knows that electronic devices can conk out, and often do.

"What one harebrained driver can do to spread carnage on a congested highway is nothing to what could happen if a tube burned out in the controls or the power failed.

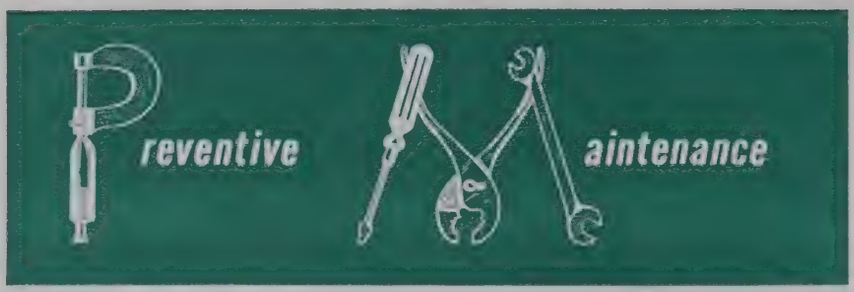
"Cost alone will delay application of the new system to public highways for a long time. Its installation would add $30,000 to $150,000 a mile to construction costs, plus around $300 to equip each car.

"Right now officials are having trouble finding money to build all the old-fashioned, drive-it-yourself highways that are needed."

San Antonio Express, disclosing that driverless cars moving 60 mph may be a common sight on electronic highways within ten years—"Built into the macadam road surface were rectangular patterns of electronic cables, carrying electricity, and creating patterns of magnetic field above the roadway.

"As the car moves over the road, its passage is recorded by detectors at the roadside that measure the car's invasion of each magnetic field.

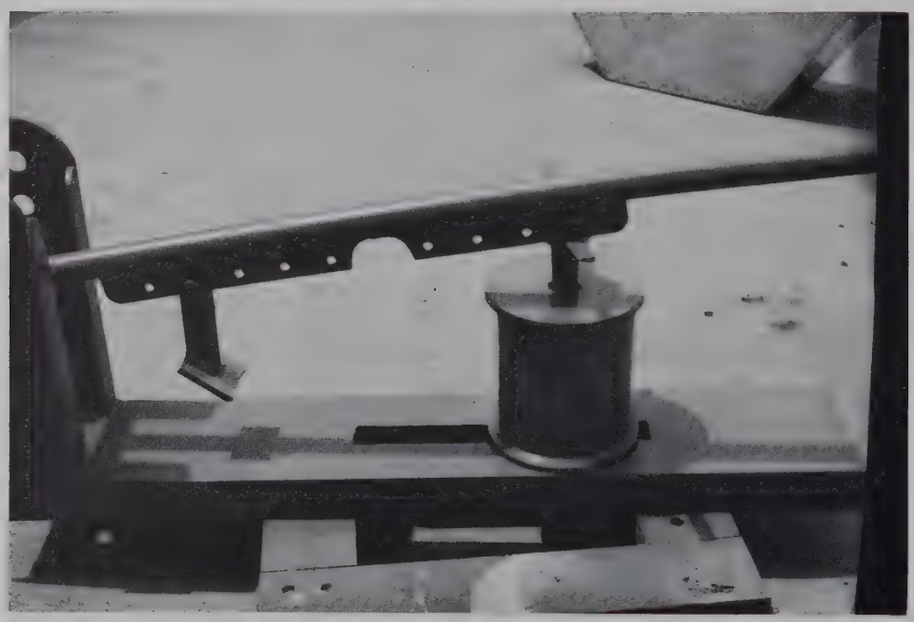
"This basic principle can be used for a variety of tasks, the [General Motors and Radio Corporation of America] experts said . . . to count cars . . . establish their speed . . . to turn on roadside electric lights as cars pass to warn following drivers in fog or other bad driving conditions."



If you have an idea that looks like a potential time or money saver, or if an idea has already proven practical in your district, why not pass it along to Equipment Shops. Your idea may benefit other districts.

A number of low-cost service items —tools that are not readily available commercially—are being designed for maintenance warehouses in Camp Hubbard Shops. Under Equipment and Procurement Division's preventive-maintenance program, these tools include a heavy-duty tire bead breaker, a tire and tube test tank, a tire-inflation safety cage, and adapter kits (see July TEXAS HIGHWAYS) for truck tire changing machines—adapters enable handling of passenger tires as well.

In foreground is the tire and tube test tank, with safety cage in background.



A close-up of the heavy duty bead breaker.

Here is the bead-breaker base, the movable center post, rear support, and handle. On the left side is the center post drum that holds the rim in position; on the right, is the locking cap for drum; and to the front, is the wing nut for tightening the cap.

The heavy-duty bead breaker, designed by Senior Equipment Supervisor Roy Greer and his mechanics in El Paso District Shops, has proved very satisfactory for grader and truck tires, including tubeless. Because of this success, District personnel passed blueprints and photographs on to D-4. Since bead breakers can be built for approximately $60, the Shops, located in Austin, already have a good many orders waiting to be filled.

Besides the bead breaker, Camp Hubbard Shops are also manufacturing a tire-inflation safety cage. When a tire is being inflated, the safety cage takes the danger out of flying lock rings. Portable, the cage is constructed of one-and-one-half-inch angle iron, is about five feet high and eighteen inches wide. It will accommodate all Highway Department tires. Several districts, including Houston, Lufkin, and Yoakum, have pioneered use of these units with success.

In action—the heavy-duty bead breaker.

This picture shows the safety inflation cage, left; the tube test tank, center; and the heavy duty bead breaker.

Another item being built at lower than commercial cost ($17) is the tire and tube test tank. Built of 20-gauge, heavy-duty galvanized steel, the tank is 48 inches long at the top, and 24 inches at the bottom. It is 16 inches wide and 17 inches deep. At the top, the tank has rolled rod reinforcement. All seams are bradded outside and soldered inside. Another feature is the double steel bottom and bradded handles. The safety tank, large enough to test tubeless truck tires mounted on the rim, will handle all tubes through 14.00 x 24 grader sizes.

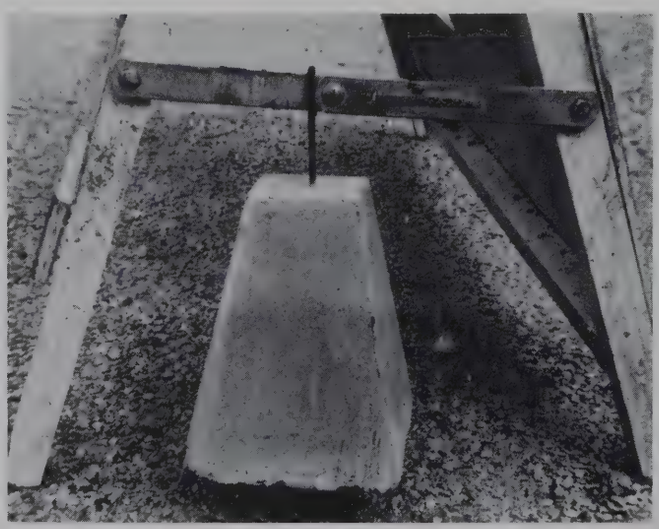
All of the foregoing items, the heavy-duty bead breaker, tire-inflation safety cage, the tire and tube test tank, and the adapter kit, may be ordered from Camp Hubbard by a general warehouse material request. Several districts have ordered a sample of the desired unit to determine suitability to their needs, then added units required.

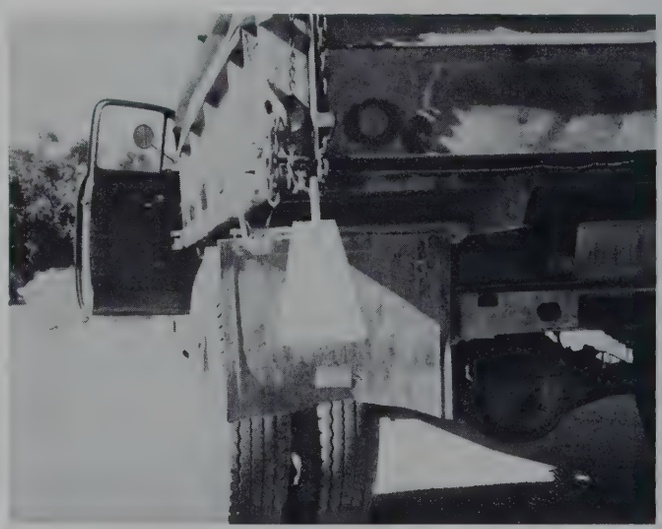
A WEIGHTY DEVICE

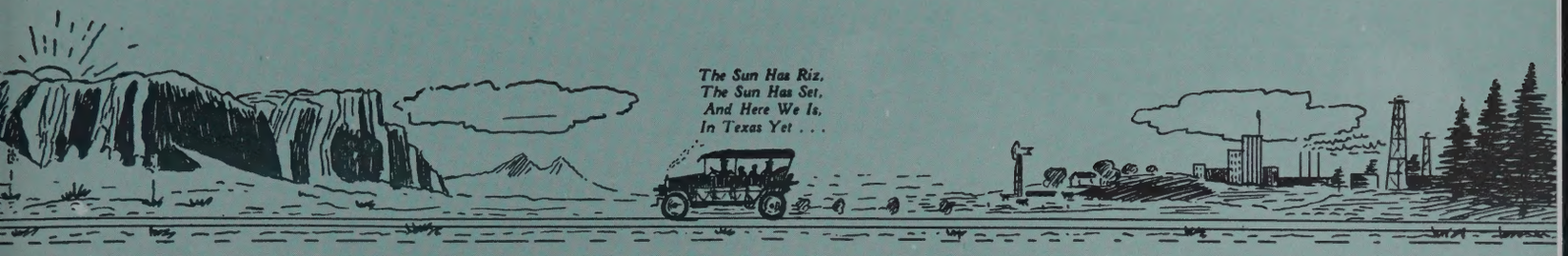
A. F. Cloud, Senior Maintenance Superintendent
District 23

This device, perfected by Floyd Forehand, Maintenance Foreman, and Elzie Perry, Skilled Laborer, in the Lampasas County section, has proven effective in holding barricades in place and is easy to transport.

It consists of a metal rod embedded in concrete and hooked on one end to hang on barricades.







OVER THE HIGHWAYS

Comments . . . from the Traveling Public

Texas has some of the best roads I ever traveled on. And the Information Bureau can't be beat.

D. E. Ottinger
Lake Charles, Louisiana

—We liked everything — especially your wonderful friendly people; your highways—which are the best anywhere; your many roadside park facilities, the likes of which only Texas has. Take it from a salesman that travels over 70,000 miles per year. Your state is tops!

Henry Holden
Tulsa, Oklahoma

We liked your divided highways where they are now completed and hope they will finish the rest of them.

Kansas City, Missouri

We were impressed by the general courtesy and hospitality shown—not the least of which was the courtesy of the officer at the Tourist Bureau. Your 60-mile-per-hour speed limit on major roads seemed unrealistic.

Curtis W. Owen
Madison, Wisconsin

Your directional highway markings need to be farther from intersections as well as at intersections. We like your roadside parks, many shade trees with well-kept area around and under them.

Chicago, Illinois

I wish to express my appreciation for the assistance given to this organization by Mr. G. K. Reading, Mr. M. L. Newton, and Mr. W. D. McKendree, of the Texas Highway Department Office in Pampa, Texas, and by Mr. Gerald Lackey of the San Angelo Office.

During a recent reconnaissance survey for an important Air Force Project in that area, conducted by a team from this Wing led by Captain Joseph F. Dubeau, these gentlemen were most helpful in providing maps, leveling data, and the loan of leveling instruments and rods. This assistance, which was furnished in a most friendly and cooperative spirit, very greatly expedited the completion of this phase of our project.

George W. Humbrecht
Colonel, USAF
Commander

We loved your six-lane freeways and good roads.

Lake Charles, Louisiana

We liked the complete and accurate information and facilities available along the Gulf Coast. This was furnished by the Texas Highway Department last April. We disliked a resurfacing project which chipped our windshield.

Oklahoma City, Oklahoma

We liked the hard shoulders on roads and the many highway signs. You have good roads and the friendly counselor gave good directions and advice.

William L. Fisher
Racine, Wisconsin

I would like to commend you for your splendid tribute to Dewitt Greer in your July issue. As an out-of-state contractor that has had the privilege of doing a number of jobs for the Texas Highway Department, I would like to add a few words to this tribute.

I feel that the greatest tribute of all to Mr. Greer is the Texas Highway Department itself. We do work in many, many states throughout the country and are daily in contact with the various highway department officials. In my dealings with the Texas Highway Department, I have been in contact with well over a hundred personnel from laborers up through Mr. Greer and I can honestly say that it has been a pleasure working with every single one of them. To a man they are well trained in their particular job, efficient, hardworking, and personable. This, in my mind, reflects the type of man you have at the head of your great highway department. My hat is off to Mr. Greer and his remarkable organization.

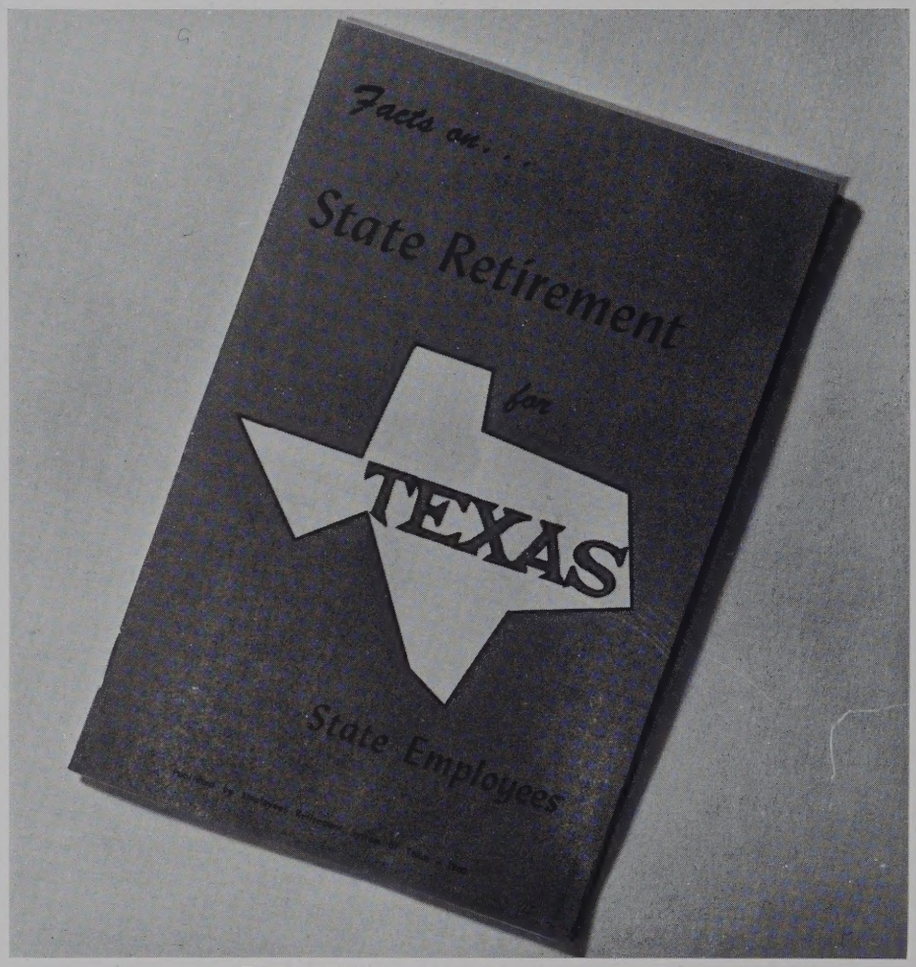
James A. Jackson
Little Rock, Arkansas

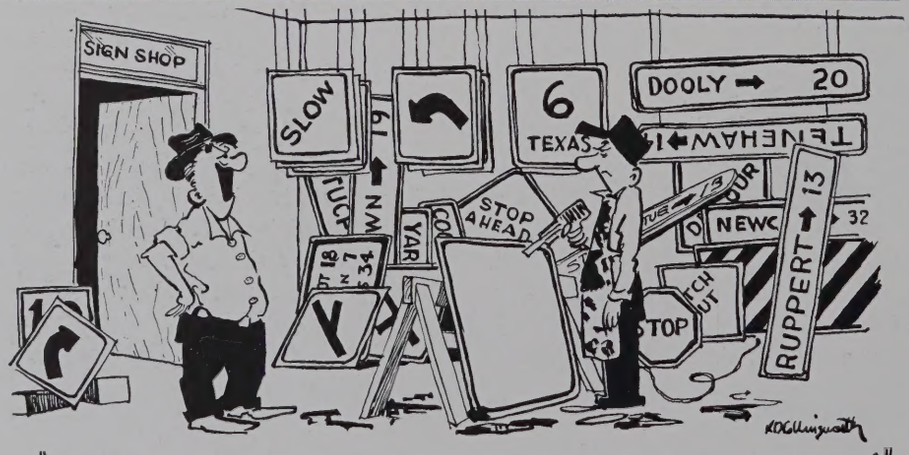
To and From Our Readers

A new state retirement booklet is off the presses with information of interest to all state employees.

"The revised booklet clarifies the new Retirement Act effective in September of 1958," says Gordon Lloyd, Executive Secretary of the Employees Retirement System.

This revision, first in eight years, was prepared jointly by the Retirement System and the Highway Department's Travel and Information Division.





"THIS SORTA REMINDS ME OF THE INTERSECTION AT STATE 20 AND F.M. 13!"

About Our Pictures . . .

On the cover, the moss-covered tree at the left frames a new bridge arching gracefully toward the sky. Located on Interstate 10, the bridge spans the Trinity River east of Houston. The streamlined structure combines with the ancient looking tree as harmoniously as if nature had planted it so.

Inside front cover, the Canadian River crossing on State Highway 15 north of Borger is the location of this month's picture. Familiar symbols of Texas industry also blend into the landscape forming a foreground and background for the bridge.

TEXAS HIGHWAY COMMISSION

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HAL WOODWARD	Member
D. C. GREER	State Highway Engineer

Texas Highways

TEXAS HIGHWAYS, official journal of the Texas Highway Department, is published in the interest of highway development in Texas and for departmental education in the improvement of construction, maintenance, and operation.

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The Highway Department is not starting a new policy and taking part in political campaigns, but in one area of the state signs of the times are posted all along the roadsides.